The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

Claims 1-170 (Cancelled)

171. (Currently amended) A system using cascaded gain elements for facilitating telecommunication capability for ~~electromagnetic propagation~~power grid and distribution medium, where said system does not ~~depend on~~require ~~an integrated~~ proprietary specific modulation and demodulation physical layer comprising:
a medium capable of carrying high frequency signals wherein ~~interrupting~~ galvanic interruption and isolation within said medium is not practical for purposes of inserting cascaded signal gain blocks; a distributed signal conditioner for high frequencies comprising transponders, the transponders at least including repeaters with analog and linear signal transfer; ~~and~~ further comprising coupler arrangements enabling connection to termination points of said medium without requiring galvanic ~~interrupting~~ interruption and isolation within said ~~medium~~ termination point;~~and~~ further comprising at least two transponder~~s using at least two~~ frequency bands for at least two signal directions, wherein said distributed signal conditioner is installed at each termination point without requiring galvanic interruption and isolation ~~ng~~ within said ~~medium~~termination point, ~~to~~ allowing at least to ~~extend~~increase signal high frequency ~~range~~bandwidth utilization of said medium, and extend signal communication distance with said medium, and provide access to said medium ~~physical layer~~analog bandwidth through transponder interfaces positioned at said termination points; whereby said system enables integration of both open standard and proprietary standard modulation and demodulation physical layer.

172. (Previously presented) The system according to claim 171, wherein said interfaces are connected with a cable modem communication standard PHY.

173. (Previously presented) The system according to claim 171, wherein said interfaces controls signal-to-noise ratio by using carrier frequencies higher than frequencies of interfering noise in said signal medium.

174. (Previously presented) The system according to claim 171, wherein said interfaces are active, powered devices located at accessible physical points to facilitate the conditioning of the signal medium.

175. (Previously presented) The system according to claim 171, wherein said interfaces are active, powered devices inserted at physical points on distance paths to facilitate the conditioning of the signal medium.

176. (Previously presented) The system according to claim 171, wherein said interfaces are active devices that through analog interfaces accept analog signals of a telecommunication standard physical layer.

177. (Previously presented) The system according to claim 171, wherein said signal conditioner in one embodiment comprises a quenching regenerative gain block operating at a suitable intermediate frequency through bi-directional filtering and bi-directional frequency conversion to allow signal medium coupling with port isolation ranging from zero and up

178. (Previously presented) The system according to claim 171, wherein said signal conditioner in one embodiment comprises quenching regenerative gain block at an intermediate frequency connected to the signal medium through separated ports, through frequency conversion, and through individual input and output amplifiers and filters, and is coupled to the medium with port isolation ranging from zero to a predetermined maximum value.

179. (Currently amended) The system according to claim 171, wherein said signal conditioner in one embodiment comprises quenching regenerative gain block through bi-directional filtering and bi-directional super heterodyne mixing for ~~same frequency band~~ shifted frequency band amplification.

180. (Currently amended) The system according to claim 171, wherein said signal conditioner in one embodiment comprises super regenerative amplification at an intermediate frequency and is connected to the medium through separated ports through frequency mixers and through individual input and output amplifiers for ~~same~~

~~frequency~~ shifted frequency band amplification.

181. (Previously presented) The system according to claim 171, wherein said signal conditioner in one embodiment comprises frequency conversion amplification at an intermediate frequency through at least two frequency conversions and frequency filtering connected to the medium through separated ports.

182. (Previously presented) The system according to claim 171, where facilitation of said distributed signal conditioner for high frequencies further comprise at least one kind of coupler to be applicable to at least one of power grids and power circuits including buried cables, and air mounted overhead cables, and outdoor power grids, and in-building power grids.

183. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies, by compensating increased high frequency signal attenuation with increased frequency in said medium, at least sustains information bandwidth.

184. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies, by compensating increased attenuation with increased frequency in said medium at least facilitates increased carrier frequencies used with said medium.

185. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies through analog gain, and gain linearity, and bandwidth, and dynamic range accommodates a plurality of modulation types.

186. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies through analog gain, and gain linearity, and bandwidth, and dynamic range is compatible with modulation types which include at least the modulation types used with QPSK, QAM, OFDM, CDMA and DSSS.

187. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies through analog gain, and gain linearity, and bandwidth, and dynamic range is compatible with a physical layer of a plurality of telecommunication standards including ITU-T J112, ITU-T J122, IEEE 802.3, IEEE 802.3x, IEEE 802.11 x, IEEE 802.16x.

188. (Previously presented) The system according to claim 171, further comprising up and down frequency conversions between the system interfaces and a telecommunication standard platform PHY.

189. (Canceled) The system according to claim 171, that utilizes inherent system attenuation to improve the system performance through a distributed presence of active and passive compensation in said apparatus.

190. (Previously presented) The system according to claim 171, wherein said apparatus can utilize distribution panel attenuation properties to aid stability and noise conditions with same frequency gain repeaters as two port amplifiers.

191. (Previously presented) The system according to claim 171 further comprising power grids as medium.

192. (Currently amended) The system according to claim 171, wherein said distributed signal conditioner for high frequencies through analog gain, and gain linearity, and bandwidth, and dynamic range is compatible with proprietary standard telecommunication platforms including PHY of PLC Power Line Communication platforms.

193. (Previously presented) The system according to claim 171, further comprising power grids wherein distribution panels, fuse panels, distribution boxes, junctions, junction boxes, substations along the signal traveling paths as hosts and power sources for signal repeaters and coupler arrangements to facilitate the distributed conditioning said medium.

194. (Previously presented) The system according to claim 171, further comprising

conductors of any of ground buried cables, air mounted cables and bare wires in differential mode using at least two conductors as pair.

195. (Previously presented) The system according to claim 171, further comprising transmission lines using a wire where the wave is trapped along the metal surface of the conductor by using transmission with short wavelength between said transponders.

196. (Previously presented) The system according to claim 171, further comprising a low voltage grid for at least one of power distribution for street lighting, and control grid.

197. (Canceled) The system according to claim 171 further comprising active, powered devices in junction points in the power grid to facilitate the conditioning of the grid towards performing like a transmission line based system.

198. (Canceled) The system according to claim 171 further comprising inherent attenuation in junctions to form multi-ports with mutual isolation to aid stability and noise conditions with super regenerative as well as super heterodyne repeaters.

199. (Previously presented) The system according to claim 171 further comprising a coupler to spaced conductors, arranged as a magnetic loop antenna providing a galvanic insulated differential signal coupling to at least two conductors carrying high voltage.

200. (Previously presented) The system according to claim 171 further comprising a coupler to the termination of a shielded cable, arranged using the shield of the cable as a capacitive coupler, using a toroid ferrite clamp on the shield grounding wire and a ferrite toroid outside on the shielded cable at a short distance from the shield grounding wire, and where the two signal connection points are at opposite sides of said toroid ferrite clamp being equal to a coupling winding through the toroid.

201. (Previously presented) The system according to claim 200 further comprising at least two of said coupler arrangements on two of said cable to provide differential

signal coupling.

202. (Previously presented) The system according to claim 171 further comprising signal coupler arrangement to said signal medium using the capacitance of an existing capacitive voltage measurement probe associated with a shielded cable assembly for medium voltage system, as coupling capacitor.

203. (Previously presented) The system according to claim 202 further comprising two said coupler arrangement with at least two of said shielded cables to provide differential signal coupling.

204. (Previously presented) The system according to claim 202 further comprising a matching device connected to said probe to optimize signal coupling through the low capacitance of said probe.

205. (Previously presented) The system according to claim 171 further comprising a fibre ring with hybrid fibre coax HFC connections to interface analog signals of said signal medium.

206. (Previously presented) The system according to claim 171 comprising other power lines than low voltage power lines to complement fibre access.

207. (Previously presented) The system according to claim 171 configured to accept D/A and A/D PHY headend equipment to be installed at any point in the system.

208. (Previously presented) The system according to claim 171, wherein said signal medium is power grid further comprising a said transponder at customer premises installed at least one of at fuse panel, and near fuse panel.

209. (Previously presented) The system according to claim 171, wherein said apparatus is arranged in distribution panels using transponders to link signals between a coupler on an incoming supply cable with couplers on outgoing cables to reduce effects from inherent losses, reflections and mismatches and to utilize

inherent attenuation in the distribution system to provide isolation between in port and out ports and between out ports.

210. (Previously presented) The system according to claim 171, wherein said apparatus includes substations linked together on power lines.

211. (Previously presented) The system according to claim 171, wherein transformer stations are equipped to facilitate routing of signals between a high voltage side and a medium voltage side through couplers and at least one of transponders, repeaters, cables, coaxial cables, fibre optic cables.

212. (Previously presented) The system according to claim 171, wherein substations are equipped to facilitate routing of signals between a medium voltage side and a low voltage side through couplers and at least one of transponders, repeaters, cables, coaxial cables, fibre optic cables.

213. (Previously presented) The system according to claim 171, wherein said apparatus in one embodiment facilitates routing of signals through a transformer station utilizing stray capacitance coupling between transformer sections.

214. (Previously presented) The system according to claim 171, wherein said signal medium further comprising said signal medium providing backbone for wireless LAN local area network coverage.

215. (Previously presented) The system according to claim 214, wherein said wireless LAN carries output from said signal medium.

216. (Previously presented) The system according to claim 214, wherein said wireless LAN carries input to said signal medium.

217. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies, further comprise shifting of carrier frequency for compensating said signal medium unfavourable characteristics.

218. (Previously presented) The system according to claim 171, wherein said distributed signal conditioner for high frequencies, further comprise physical penetration of cables in long cable runs to insert repeating transponders with couplers to compensate for cable attenuation.

219. (Previously presented) The system according to claim 171, wherein said apparatus is arranged to improve immunity properties at various physical positions using active cancellation of common mode noise from any of near field sources and far field sources by using reference sampling antennas and reference sampling probes for the common mode energy which aids identifying, characterizing and canceling common mode interference.

220. (Previously presented) The system according to claim 171, wherein said apparatus is arranged to accept any suitable number of any of A/D and D/A headend equipment to be supplementary installed in any location in said system.

221. (Previously presented) The system according to claim 199, wherein said apparatus is arranged to incorporate non-galvanic high frequency interfacing by using fibre optic connection to a repeater transponder with magnetic loop antenna installed adjacent to at least two conductors carrying high voltage.

222. (Canceled) The system according to claim 171, wherein said apparatus is arranged to incorporate voltage transitions through coaxial cables.

223. (Previously presented) The system according to claim 171, wherein said apparatus incorporates repeater nodes that have built-in processing capability in the form of a processor.

224. (Previously presented) The system according to claim 223, wherein said apparatus incorporates repeater nodes that interface with at least one of remotely interrogated sensors, and remotely activated actuators.

225. (Previously presented) The system according to claim 171, wherein said apparatus includes a number base stations units installed at different locations.

226. (Previously presented) The system according to claim 171 further comprising separate repeater functions in separate frequency bands in order to achieve more than one signal transmission direction.

227. (New) The system according to claim 171, wherein at least one of none galvanic and galvanic coupling to two and three phase low voltage cables use differential mode through coupler with balun using a conductor pair of the low voltage cable comprising clamp on magnetic material on conductors toward rails for isolation towards at least one of low voltage rails, and other termination devices connected to rail.

228. (New) The system according to claim 171, further comprising transmission lines using single wire coupling.

229. (New) The system according to claim 171, 214, 215, 216 in which a plurality of combinations of said apparatus offer alternative transponder solutions for radio navigation, radio positioning, radio direction finding, radio ranging, RFID radio frequency identification.

230. (New) The system according to claim 171, that utilizes at least one added termination point at any accessible physical position in between at least two existing termination points.